

**Amendments to the Claims:**

This listing of the claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claim 1 (Currently Amended): ~~Method~~ A method for the production of an electro-optical printed circuit board ~~(11)~~, having a number of layers ~~(24, 30)~~ with electrically conductive elements ~~(12)~~, and at least one optical layer ~~(13)~~ with optically conductive elements ~~(22)~~, ~~particularly with waveguides (22)~~,

wherein the at least one optical layer ~~(13)~~ has a polysiloxane material, and ~~that~~ wherein structuring of the elements ~~(22)~~ in a form of channel waveguides of the optical layer ~~(13)~~ takes place by means of casting into a casting mold ~~(21)~~ that contains the waveguide structures as a negative mold, whereby ~~the~~ a mechanical connection between the optical layer ~~(13)~~ and ~~the~~ at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers is produced in direct connection with the production of the optical layer ~~(13)~~.

Claim 2 (Currently Amended): ~~Method~~ The method according to claim 1, wherein the mechanical connection between the optical

layer ~~(13)~~ and the at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers is produced directly during the production of the elements ~~(22)~~ of the optical layer ~~(13)~~.

Claim 3 (Currently Amended): ~~Method~~ The method according to claim 2, wherein the optical layer ~~(13)~~ is formed from a core polysiloxane ~~(22)~~ having a higher index of refraction, as well as a first polysiloxane as a superstrate layer ~~(23)~~, having a low index of refraction, and a second polysiloxane as a substrate layer ~~(29)~~, having a low index of refraction, in the form of cover layers on the core polysiloxane ~~(22)~~.

Claim 4 (Currently Amended): ~~Method~~ The method according to claim 3, wherein the ~~superstrate~~ first polysiloxane ~~(23)~~ is applied to the core polysiloxane ~~(22)~~, which has already solidified, in liquid form, brought into connection with a the at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers in its liquid phase, and subsequently cross-linked.

Claim 5 (Currently Amended): ~~Method~~ The method according to claim 3, wherein the ~~substrate~~ second polysiloxane ~~(29)~~ is

applied to the core polysiloxane (22), which has already solidified, in liquid form, brought into connection with a the at least one layer (30) of the electrically conductive printed circuit board layers in its liquid phase, and subsequently cross-linked.

Claim 6 (Currently Amended): ~~Method~~ The method according to claim 4, wherein after cross-linking of the superstrate polysiloxane layer ~~of or the substrate layer (29) or the superstrate (23)~~, the at least one layer (24) of the electrically conductive printed circuit board layers is mechanically fixed in place on the superstrate polysiloxane layer or the substrate layer (23, 29).

Claim 7 (Currently Amended): ~~Method~~ The method according to claim 3, wherein pit structures (34) of a casting mold (21) are filled with the core polysiloxane, the core polysiloxane (22) having a higher index of refraction, and hardened, in a first step; ~~a~~ the first polysiloxane having a low index of refraction is applied as a the superstrate layer (23), in a second step, in such a manner that ~~it~~ the superstrate layer bonds to the core polysiloxane, (22); the superstrate layer (23) ~~with~~ having the optically conductive elements (22) situated on the superstrate

layer; it are the superstrate layer with the optically conductive elements is separated from the casting mold (21), in a third step; and ~~a~~ the second polysiloxane having a low index of refraction is applied to the core polysiloxane (22) as ~~a~~ the substrate layer (29), in a fourth step.

Claim 8 (Currently Amended): ~~Method~~ The method according to claim 3, wherein the polysiloxane substrate (29) having the low index of refraction is produced by means of casting technology, with pit structures (34), in a first step; ~~that a~~ wherein the core polysiloxane (22) having a higher index of refraction is filled into the ~~pits (34)~~ pit structures in a second step to form a composite of polysiloxane substrate/core polysiloxane; and ~~that a~~ wherein the first polysiloxane having a low index of refraction is applied to the composite of polysiloxane substrate/core polysiloxane (29, 22) as ~~a~~ the superstrate layer (23), in a third step.

Claim 9 (Currently Amended): ~~Method~~ The method according to claim 3, wherein the at least one layer (24, 30) of the electrically conductive printed circuit board layers has micro-structured spacers (25, 31) on ~~the~~ a side facing the ~~liquid~~ second polysiloxane in a liquid phase of the substrate layer (29)

or the first polysiloxane in a liquid phase of the superstrate layer (23), respectively, which guarantee a defined thickness of the substrate layer ~~(29)~~ or superstrate layer ~~(23)~~, respectively.

Claim 10 (Currently Amended): ~~Method~~ The method according to claim 1, wherein the mechanical connection between the optical layer ~~(13)~~ and the at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers is produced subsequent to production of the optical layer ~~(13)~~.

Claim 11 (Currently Amended): ~~Method~~ The method according to claim 10, wherein the optical layer ~~(13)~~, ~~consisting of~~ comprises at least one of a polysiloxane substrate, a ~~(29)~~ and/or polysiloxane core, and a ~~(22)~~ and/or polysiloxane superstrate ~~(23)~~, and is first produced as an independent layer, and subsequently ~~brought into mechanical connection~~ mechanically connected with one or more layers ~~(24, 30)~~ of the electrically conductive printed circuit board layers either on one or both sides of the electrically conductive printed circuit board layers.

Claim 12 (Currently Amended): ~~Method~~ The method according

to claim 11, wherein the ~~connection of the~~ optical layer ~~(13)~~ is mechanically connected with ~~a layer (24, 30)~~ the one or more layers of the electrically conductive printed circuit board layers ~~is produced by means of~~ via lamination or gluing.

Claim 13 (Currently Amended): ~~Method~~ The method according to claim 1, wherein the at least one optical layer with optically conductive ~~layer (22)~~ elements is handled jointly with the at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers during ~~the~~ production of the electro-optical printed circuit board ~~(11)~~.

Claim 14 (Currently Amended): ~~Method~~ The method according to claim 1, wherein ~~the~~ adhesion promoters are used to support the mechanical connection of the polysiloxane material of the optical layer ~~(13)~~ with the at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers.

Claim 15 (Currently Amended): ~~Method~~ The method according to claim 14, wherein a polymer layer that adheres well to the at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers is applied to the optical layer ~~(13)~~ as an

adhesion promoter.

Claim 16 (Currently Amended): ~~Method~~ The method according to claim 1, wherein a physical and/or chemical treatment of ~~the a~~ surface of the at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers, ~~which said at least one layer is being~~ connected with the optical layer ~~(13)~~, is performed in order to achieve activation of the surface for improved adhesion to the optical layer ~~(13)~~.

Claim 17 (Currently Amended): ~~Method~~ The method according to claim 16, ~~wherein~~ further comprising influencing adhesion properties of the at least one layer ~~(24, 30)~~ of the electrically conductive printed circuit board layers that is mechanically connected with the optical layer ~~(13) is influenced in its adhesion properties~~ with regard to the optical layer ~~(13) by means of~~ via flaming with gases.

Claim 18 (Currently Amended): ~~Method~~ The method according to claim 16, ~~wherein~~ further comprising influencing adhesion properties of the at least one layer ~~(24, 30)~~ of the electrically

conductive printed circuit board layers that is mechanically connected with the optical layer ~~(13)~~ ~~is influenced in its~~ ~~adhesion properties~~ with regard to the optical layer ~~(13)~~ ~~by means of~~ via plasma irradiation.

Claim 19 (Currently Amended): ~~Method~~ The method according to claim 1, wherein ~~the casting techniques for structuring the~~ optically conductive elements ~~(22)~~ ~~are carried out~~ structured by casting essentially at ambient temperatures.

Claim 20 (Currently Amended): ~~Method~~ The method according to claim 1, wherein during casting of the optically conductive elements ~~(22)~~, ~~the surface of the~~ a cast optically conductive surface of the optically conductive elements ~~(22)~~ is drawn off by ductors and thereby the casting mold ~~(21)~~ is filled completely.

Claim 21 (Currently Amended): ~~Method~~ The method according to claim 1, wherein ~~by means of the~~ via casting techniques for structuring the optically conductive elements ~~(22)~~, large-area structures of the optically conductive elements ~~(22)~~ ~~can be~~ are produced.



Claim 22 (Currently Amended): ~~Method~~ The method according to claim 1, wherein the polysiloxane material ~~can be~~ has elastic properties and is unmolded even from casting technology depressions ~~(34)~~ having very steep walls or depressions having undercuts, without impairment, because of ~~its~~ the elastic properties of the polysiloxane material.

Claim 23 (Currently Amended): ~~Method~~ The method according to claim ~~±~~ 7, ~~wherein the~~ further comprising producing coupling elements ~~(14)~~ for optical coupling of the optically conductive elements ~~(22)~~ to electrically conductive elements ~~(15, 16, 17)~~ of the electrically conductive printed circuit board layers ~~(12)~~ to be functionally connected ~~are produced~~ at the same time when the optical layer ~~(13)~~ having the optically conductive elements ~~(22)~~ is cast.

Claim 24 (Currently Amended): ~~Method~~ The method according to claim 23, wherein the ~~casting molds (34)~~ pit structures for the optically conductive elements ~~(22)~~ possess beveled flanks at ~~the~~ ends ~~(33)~~, preferably at 45° of the pit structures; and wherein the optical layer has molded segments (28) of the optical layer that are molded on in the optical layer (13) are metallized locally (28)

~~by means of these~~ via said flanks (14) after unmolding, and then ~~possess the function of~~ as integrated deflection mirrors (14).

Claim 25 (Currently Amended): ~~Method~~ The method according to claim 1, wherein the optically conductive elements (22) of the optical layer (13) contain intersections, branches, mixers, wavelength multiplexers and wavelength de-multiplexers, and switching elements.

Claim 26 (Currently Amended): ~~Method~~ The method according to claim 1, wherein the optically conductive layer (22) made of a polysiloxane material ~~permits temperature~~ stabilizes stability of the optical layer of the electro-optical printed circuit board (11), ~~for example during soldering processes up to essentially~~ 250°C, without impairment of the optical properties of the elements (22) of the optical layer (13).

Claim 27 (Currently Amended): ~~Method~~ The method according to claim 1, wherein the printed circuit boards (24) ~~are~~ board is formed from at least one material selected from the group consisting of fiberglass-filled epoxy resin, ~~and/or~~ Kapton, ~~and/or~~

Teflon ~~and/or~~ and glass, ~~which are the board~~ not being provided with electrically conductive layers ~~(12)~~ at all, or provided with ~~them~~ electrically conductive layers on one side or both sides of the board.

Claim 28 (Currently Amended): ~~Method~~ The method according to claim 1, wherein the printed circuit ~~boards (24)~~ used are board is provided with electrical conductor tracks ~~(12)~~ on one side or both sides of the printed circuit board.

Claim 29 (Currently Amended): ~~Electro-optical~~ An electro-optical printed circuit board ~~(11)~~ produced according to the method of claim 1.

Claim 30 (Currently Amended): Use of an electro-optical printed circuit board ~~(11)~~ produced according to the method of claim 1 in multi-layer boards, wherein additional layers of the printed circuit board ~~(11)~~ or additional printed circuit boards ~~(11)~~ are added to a multi-layer composite, on one or on both sides of ~~the~~ a composite of optical layer ~~(13)~~ and layers ~~(24, 30)~~ that are connected with the optical layer ~~(13)~~, produced according to the method.

Claim 31 (Currently Amended): Use of an electro-optical printed circuit board ~~(11)~~ produced according to the method of claim 1 as a line-bound optical connection element, wherein ~~the~~ a composite of optical layer ~~(13)~~ and layers ~~(24, 30)~~ of the printed circuit board ~~(11)~~ connected with the optical layer ~~(13)~~, produced according to the method, is applied to a rigid carrier medium.

Claim 32 (Currently Amended): Use of an electro-optical printed circuit board ~~(11)~~ produced according to the method of claim 1 as a line-bound optical connection element, wherein ~~the~~ a composite of optical layer ~~(13)~~ and layers ~~(24, 30)~~ of the printed circuit board ~~(11)~~ connected with the optical layer ~~(13)~~, produced according to the method, is applied to a flexible carrier medium.

Claim 33 (Currently Amended): Use of an electro-optical printed circuit board ~~(11)~~ produced according to the method of claim 1 as an integrated optical component, wherein optical power splitters, optical mixers, optical switches, optical modulators, wavelength multiplexers, wavelength de-multiplexers, or optical attenuators are used as optical elements ~~(22)~~.